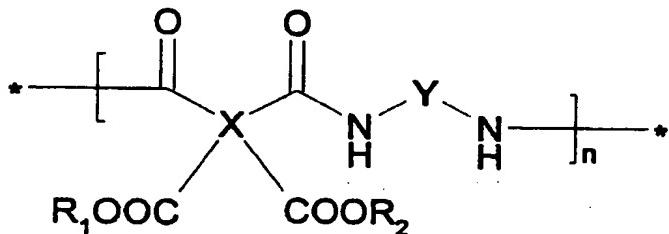


What is claimed is:

1. A reactive transparent polyimide precursor having the structure represented by the following Chemical Formula 1:

5        <Chemical Formula 1>



wherein X is a tetra-valent organic group derived from alicyclic tetracarboxylic acid dianhydrides having 3 to 30 10 carbon atoms;

Y is a di-valent organic group derived from aliphatic, alicyclic, or non-conjugated aromatic diamines of which number of carbon atoms is 3 to 30 and side chains have one or more ethylenically unsaturated bonds that may be crosslinked by a 15 radical; and

R<sub>1</sub> and R<sub>2</sub> are independently each other hydrogen atom, or organic group having 1 to 20 carbon atoms including one or more ethylenically unsaturated bond(s), provided that they are not hydrogen atom at the same time.

20

2. The reactive transparent polyimide precursor according to Claim 1, wherein the acid value of said reactive transparent

polyimide precursor is within a range of 30 to 200 mg KOH/g.

3. The reactive transparent polyimide precursor according to Claim 1, wherein the molecular weight of said reactive  
5 transparent polyimide precursor is within a range of 2,000 to 200,000.

4. A method for preparing the reactive transparent polyimide precursor having the Chemical Formula 1 of Claim 1  
10 comprising the steps of:

preparing transparent linear polyamic acid (A) from (a-1) one or more of tetracarboxylic acid dianhydrides selected from alicyclic tetracarboxylic acid dianhydrides having 3 to 30 carbon atoms, and (a-2) one or more of diamines selected from aliphatic, 15 alicyclic, or non-conjugated aromatic diamines of which number of carbon atoms is 3 to 30 and side chains have one or more ethylenically unsaturated bonds that may be crosslinked by a radical; and

esterifying the transparent linear polyamic acid (A) thus  
20 obtained with an ethylenically unsaturated compound (B) containing an epoxy group in the same molecule.

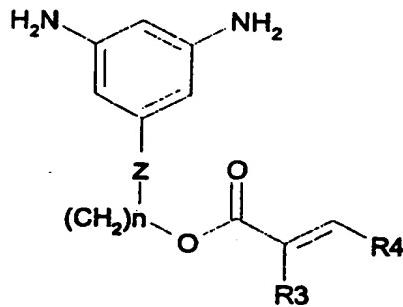
5. The method for preparing the reactive transparent polyimide precursors according to Claim 4, wherein the  
25 tetracarboxylic acid dianhydride(s) is one or more selected from

the group consisting of 1,2,3,4-cyclobutanetetracarboxylic acid dianhydride (CBDA), 1,2,3,4-cyclopentanetetracarboxylic acid dianhydride (CPDA),  
5 bicyclooct-7-ene-2,3,5,6-tetracarboxylic acid dianhydride (BODA),  
10 5-(2,5-dioxotetrahydrofuran-3-yl)-3-methylcyclohexene-1,2-dicarboxylic acid anhydride (DOCDA), and 4-(2,5-dioxotetrahydrofuran-3-yl)-tetralin-1,2-dicarboxylic acid anhydride (DOTDA).

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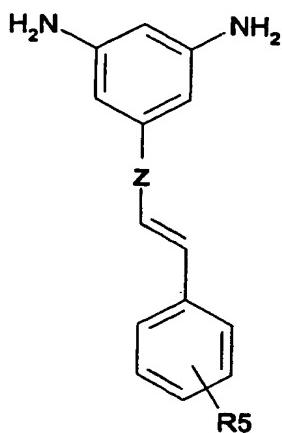
6. The method for preparing the reactive transparent polyimide precursors according to Claim 4, wherein the diamine(s) is one or more selected from the group consisting of diamines having the general formulae represented by the following  
15 Chemical Formulae 7 to 9:

<Chemical Formula 7>

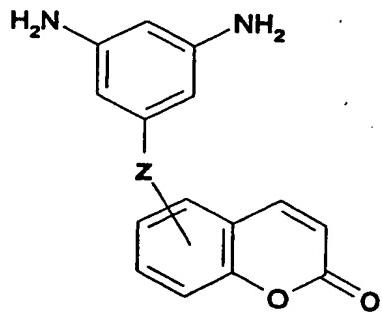


<Chemical Formula 8>

AMENDED SHEET(ART. 34)



&lt;Chemical Formula 9&gt;



5 wherein Z is one of ester, amide, imide, ether, and carbonyl group;

R<sub>3</sub>, R<sub>4</sub>, and R<sub>5</sub> are independently each other hydrogen atom or alkyl or aryl group having 1 to 20 carbon atoms; and n is an integer of 1 to 20.

10

7. The method for preparing the reactive transparent polyimide precursors according to Claim 4, wherein the diamine(s) is one or more selected from the group consisting of 2-(methacryloyloxy)ethyl 3,5-diaminobenzoate,

3,5-diaminophenyl cinnamate, and coumaronyl  
3,5-diaminobenzoate.

8. The method for preparing the reactive transparent  
5 polyimide precursors according to Claim 4, wherein the  
ethylenically unsaturated compound (B) containing an epoxy group  
in the same molecule is one or more compounds selected from the  
group consisting of allyl glycidyl ether, glycidyl acrylate,  
glycidyl methacrylate, 3,4-epoxycyclohexylmethyl acrylate,  
10 3,4-epoxycyclohexylmethyl methacrylate, glycidyl  
5-norbornene-2-carboxylate (a mixture of endo and exo forms),  
glycidyl 5-norbornene-2-methyl-2-carboxylate (a mixture of  
endo and exo forms), 1,2-epoxy-5-hexene, and  
1,2-epoxy-9-decene.

15

9. A photosensitive polyimide precursor resin composition,  
characterized in that it is prepared by using the reactive  
transparent polyimide precursor of Claim 1 and one or more  
photo-initiators as essential components, and adding one or more  
20 compounds selected from the group consisting of photosensitizers,  
multi-functional monomers, and common coating additives if  
necessary.

10. The photosensitive polyimide precursor resin  
25 composition according to Claim 9, wherein the weight of the

reactive transparent polyimide precursor is in the range of 10 to 99 weight % relative to the weight of the total solids and the weight of the photo-initiators is in the range of 0.1 to 90 weight % relative to the weight of the total solids.

5

11. The photosensitive polyimide precursor resin composition according to Claim 9, wherein the thickness of polyimide film obtained from the photosensitive polyimide precursor resin composition is in the range of 0.5 to 100  $\mu\text{m}$ .

10

12. The photosensitive polyimide precursor resin composition according to Claim 9, wherein the thermal decomposition temperature of polyimide film obtained from the photosensitive polyimide precursor resin composition is within 15 a range of 300 to 500°C.

13. The photosensitive polyimide precursor resin composition according to Claim 9, wherein the transmittance between 400 to 700 nm of polyimide film obtained from the 20 photosensitive polyimide precursor resin composition is 90% or higher.

14. The photosensitive polyimide precursor resin composition according to Claim 9, wherein the dielectric constant 25 of polyimide film measured at 1 kHz, obtained from the

photosensitive polyimide precursor resin composition, is within a range of 2.5 to 4.0.

15. A photosensitive transparent protection layer or  
5 insulation layer, characterized in that it is prepared by using the photosensitive polyimide precursor resin composition according to Claim 9.

16. A liquid crystal display device, characterized in that  
10 the photosensitive polyimide precursor resin composition according to Claim 9 is applied to transparent protection layer(s) or insulation layer(s).

17. A liquid crystal display device, characterized in that  
15 the photosensitive polyimide precursor resin composition according to Claim 9 is applied as organic insulation materials for liquid crystal display device.